MATERIAL 3

BUDDHISM AND SCIENCE

A comparison of Buddhist statements with excerpts from an essay by physicist René Staritzbichler (italicized in the text)(trans. by the author):

Buddhism is a practical path of practice to bring out the inherent qualities of fearlessness, lasting happiness, perfect wisdom, and active compassion in everyone.

In doing so, Buddha's teachings and the Buddhist practice path are based on 3 pillars:

- Information and knowledge transmission of how our mind works
- Meditation, through which one leaves behind pure concepts and thinking, in order to find an access to the inherent potential beyond the intellect
- Practical application and methods to implement the experiences gained from meditation in everyday life for the benefit of oneself and all others

The goal of Buddha's teaching is to go beyond beliefs and assumptions to an experience of reality with all its possibilities. Buddha experienced insights, which are more and more confirmed by modern science, through meditation and passed them on to his disciples as useful knowledge.

The Buddhist knowledge about the nature of our mind helps to become aware of reality - beyond our own and other people's fixed ideas and constricting feelings that cloud our view of reality. Thus, beyond fears and expectations, it is possible to recognize how our mind works and to gain access to all inherent qualities.

Buddhist knowledge about the mind is therefore not a mere philosophy, which in itself does not change the person, but has a practical use and is confirmed in meditation by one's own meditation experiences and becomes a holistic experience of reality.

Buddha's statement not to simply believe something, but to critically examine it oneself by reflecting, examining, meditating on it, in order to penetrate the knowledge holistically beyond the limited intellect, and then to apply it in everyday life and to examine its usefulness, make Buddha's teaching a critical method applicable to everyone.

Thus, working with the mind in Buddhism is a pragmatic approach to reality i.e., recognizing the nature of all phenomena. The insights must stand up to scrutiny in meditation and prove themselves in practical application in everyday life. In this respect, Buddhism is not a faith, but rather a scientific approach to the mind.

Modern science gains knowledge about the world of appearances with measurable experiments, which are objectified by analysis and abstraction, i.e. a validity is aimed at independently of the respective observer. Despite the different methodical approach, many statements of the Buddhist teachings agree with those of physics.

In what can analogies be found in Buddha's teachings and modern science?

"The fundamental theories - Planck's quantum physics begun in 1901, Einstein's special theory of relativity begun in 1905 - can be assigned, along with more recent findings in nuclear and elementary particle physics, to three Buddhist areas of cognition: "form and emptiness", "cause and effect" [and "observer and reality"], [...]".

The Buddhist concept of "emptiness" of all things means that all appearances or phenomena are in constant change, that space itself, which has inherent consciousness, is constantly creating forms out of itself in infinite variety, which also dissolve again. Phenomena arise and pass away. All phenomena, no matter whether tiny or huge, are thus "empty" of a permanent self-existence.
From Buddha's view form and emptiness thus always belong together.

"FORM AND EMPTINESS"
In our world of experience, there is nothing that has existed in its present state since beginningless time and will continue to exist in this way in the endless future. Everything comes into being and passes away, the form does not remain as it is and therefore cannot be absolute. Its mutability is an indication

of the emptiness of things.

However, it would be possible that the form as it appears to us is composed of permanent building blocks that are beyond our perception and that remain eternally the same. Just as one could tear down ugly walls and build a beautiful castle from the same stones: The building would have changed, but the stones would have remained the same. Then beyond our perception, on a small scale, the form would not change - it would not be "empty".

That this is not the case is proven by findings in physics. Matter can dissolve, come into being, and it can change into other matter: During the decay of atomic nuclei, a part of matter is dissolved. It becomes the movement of the fragments, i.e. the fragments move away from each other with high speed. Another part of the matter dissolves thereby into "light" (electromagnetic radiation).

If matter meets its antimatter, they also become "light". Conversely, "light" can change into matter and antimatter. Matter can originate together with antimatter from the "nothing", however, disappears again after extremely short time. There is no matter which cannot be changed. The invisible building blocks of our world of experience are "empty".

[...] There is nothing which is not subject to change. There are no absolutely permanent forms of existence; only "something" which includes form and change ([Buddhistically speaking] form and emptiness), and which we call energy, remains. What happens if there is no form? From the space in which "nothing" is, the vacuum, extremely many particle-antiparticle-pairs arise constantly, without "reason". That matter arises from nothing, massively contradicts the conservation of energy. But there is in the physics of the small, the quantum mechanics, a so-called energy-time-uncertainty. That means, the conservation of energy is valid, but not exactly. For fractions of a second the law can be violated: the shorter, the greater the deviation from the exact conservation, i.e. the more matter is created, the shorter it can exist. The particle-antiparticle pairs created from nothing can exist therefore only very short time, before they disappear again into the space. Since they cannot exist freely, they are called virtual. Virtual particles/antiparticles cannot arise separately, only as a pair. But they exist, they arise and pass away - and they are detectable!

CAUSE AND EFFECT

Cause and effect is a principle that applies in Buddhism as well as in physics. In the Buddhist view of karma, an effect does not directly follow the cause. In the external world of appearance, an effect can occur years after the cause, but exactly when is not necessarily determined. [...]" From the Buddhist point of view, the mind is unlimited like the all-pervading space that has inherent awareness. This awareness "stores all causes and generates a world corresponding to the quality of the preceding deeds, words and thoughts. The situation in the now, the conditions that one finds, are composed of many actions of the past. And each action will have an effect on the future. But if there were only cause and effect, then one would be at the mercy of an endless, unchangeable sequence of effects, without being able to intervene - without any freedom. Freedom consists precisely in not being subject to conditions in one's actions, not having to follow every thirst, every anger, but being able to break this cycle. Enlightenment means to be free from karma, from cause and effect. [...]"

Cause and effect, according to Buddhist understanding, is an acting reality principle as long as one succumbs to the illusion of being an independent "I" separate from others. If one experiences in meditation that there is neither in thoughts and feelings nor in the body a permanent "I", everything that appears in the space of the mind, "exists" for a time and then dissolves again in the space of the mind, is experienced as the "free play of space". Free from identification with an "ego," one will cease to act disturbed and personally offended or self-centered.

"[T]here is, however, the freedom of decision in the now. And unlike classical physics (by which one usually means the physics before quantum mechanics), the experience of an effect need not immediately follow the cause.

Classical physics sees the world as a "billiard game": If one knows exactly how the shot will come, one knows exactly how the balls will move - and one believed in classical physics to know thus everything exactly. A fixed future without freedom of choice. In the impacts, the balls react immediately and not in the next game. Classical physics and Buddhism contradict each other! On elementary level, in the

quantum mechanics, the view changes and one finds agreement with the Buddhism. For this we go again to the nuclear decay: Roughly said, a nucleus decays because it can, because energy becomes "free". The more energy is released in the decay, the faster it will decay, or the more likely it will decay. But there is nothing that forces it to decay at a particular time. There is no reason why it must decay at a certain time - it lacks an "internal clock" - unlike, for example, a human being, who is seen to be aging and thus the probability of "its decay". For a large quantity of nuclei one can say exactly when for example half of the nuclei will have decayed, the probability becomes a compelling law, which becomes the more exact the more nuclei are present. As with karma, an effect does not immediately follow a cause.

The belief of classical physics that it can know everything precisely turns out to be a fundamental error in quantum mechanics; for example, the future of a single nucleus is in principle unknown."

SPACE AND INFORMATION

"The law of cause and effect requires that causes come before effects. In other words, time must have a fixed direction, namely the one we are familiar with. If time could change its direction, effects would come before their causes. [...] However, there is an experiment in which apparently information is transferred with faster than light speed: The EPR experiment (Einstein-Podolsky-Rosen) was initially a thought experiment to show the weaknesses of quantum mechanics: An atomic nucleus decays into two equal parts. At the same moment you affect one part, the other "knows" about it - even at large distances. In quantum mechanics, they remain one system, one whole, which is why they know about each other even though they have separated. This knowledge is faster than light, although it is not transmitted in the conventional sense by moving an information carrier (for example light) from one part to another. And just because it is not a "moving" transmission, this does not violate cause and effect, the mechanism is of a different kind. [...]"

Similar phenomena are also evident in the experiments about the entangled parts. In Buddhism one speaks of the inseparability of "space and information". This means that for an enlightened person whose perceptive mind is not clouded by dualistic concepts, it is possible to take information inherent in space spontaneously and effortlessly. Even non-enlightened people have access to it again and again, which is especially evident in dangerous situations, for example, when one intuitively has the intuition that something is happening to a close person at that very moment. We are connected with each other through space.

"OBSERVER AND REALITY"

"What is the role of the one who perceives, the observer, in physics and Buddhism? [...]"

By directing his attention - the ability to perceive - away from external and internal phenomena to that which perceives, Buddha recognized the nature of mind. He compared what is perceived to the images that come and go in the mirror and the perceiver to the mirror. The "inner" phenomena such as one's body, thoughts and feelings and the "outer" phenomena such as the surrounding world are in constant change. The mind that perceives is timeless and equal to space. However, there is no dualistic separation between the perceived and the perceiver. They are unseparated and yet not the same. In the Buddhist context one speaks of the "free play of space".

"Since "reality" as such is something difficult to grasp and define, classical physics held to a reality that is impersonal and timeless, that can be perceived by everyone in the same way, at any place and at any time - i.e. a reality that can be described by laws of nature. The observer must have no meaning. Observer and observed are separated, that means the same reality must exist, whether one observes it or not. The rough scale of the senses allows this view: The gentleman with the club is standing in front of you, whether you have your eyes open or not. With hundred million times smaller objects it is a little bit different: On the one hand, because only a measuring apparatus can "see" them. And then such small objects are influenced, changed by every observation. In order to measure, something must take place between object and measuring device, which always has effects on the object. Every observation changes the "reality".

Furthermore, the future of a single object of this size is not determined, which means that already shortly after a measurement one does not know anything with certainty about the object. If one does

not observe, one does not know anything definite about "reality" because it can change unpredictably. These two insights led to the view of quantum mechanics that nothing can be said about a reality unseparated from the observer. [...]"

Source of slanted passages:
René Staritzbichler: Physik und Buddhismus – Ein Vergleich, in: Buddhismus Heute Nr. 31, 2.000 und Nr. 32, 2.001